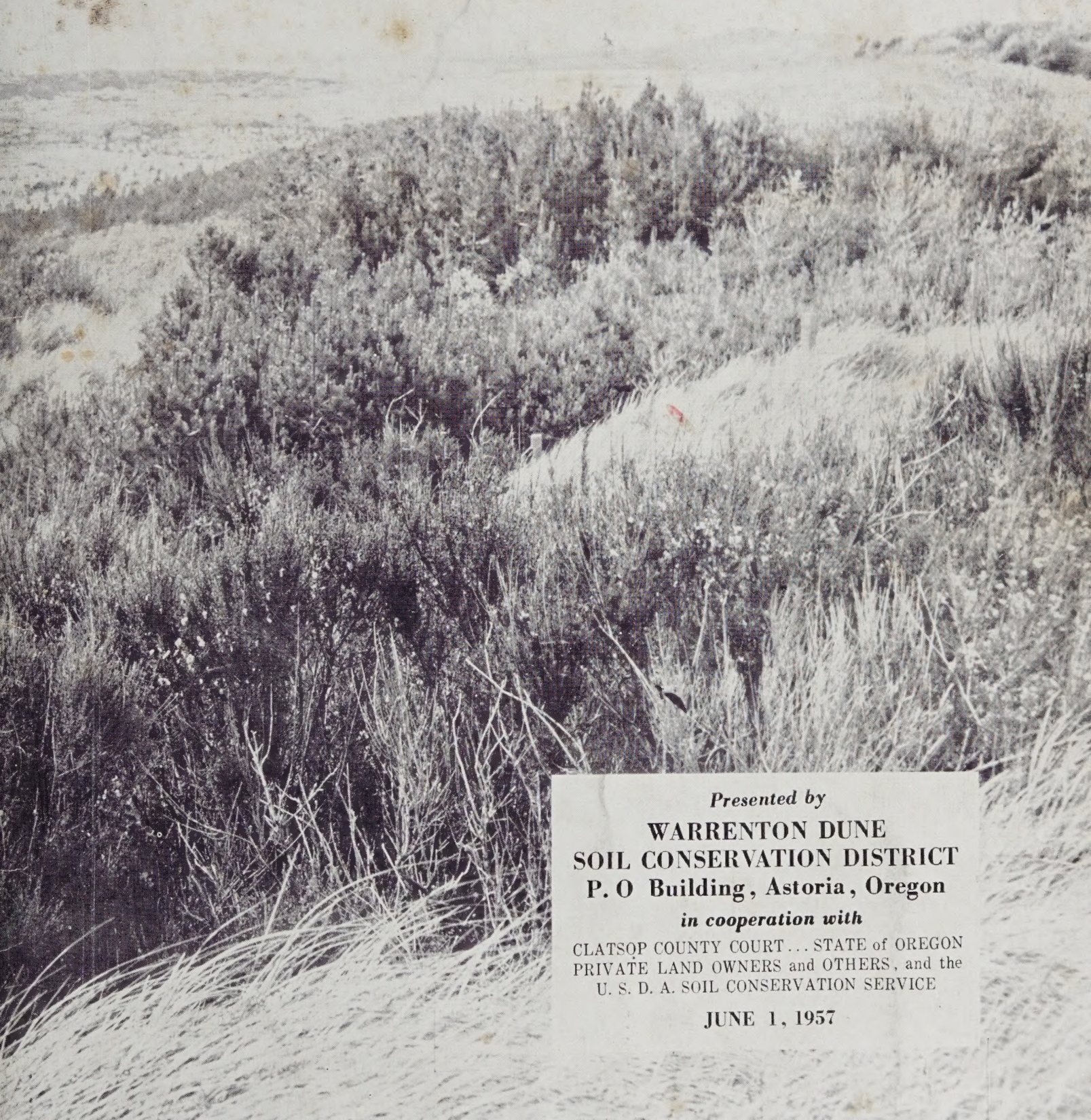


Clatsop

VEGETATION RESTORES LIFE TO COASTAL DUNES

.... rebuilds sagging economic strength of Oregon communities



Presented by

**WARRENTON DUNE
SOIL CONSERVATION DISTRICT
P. O. Building, Astoria, Oregon**

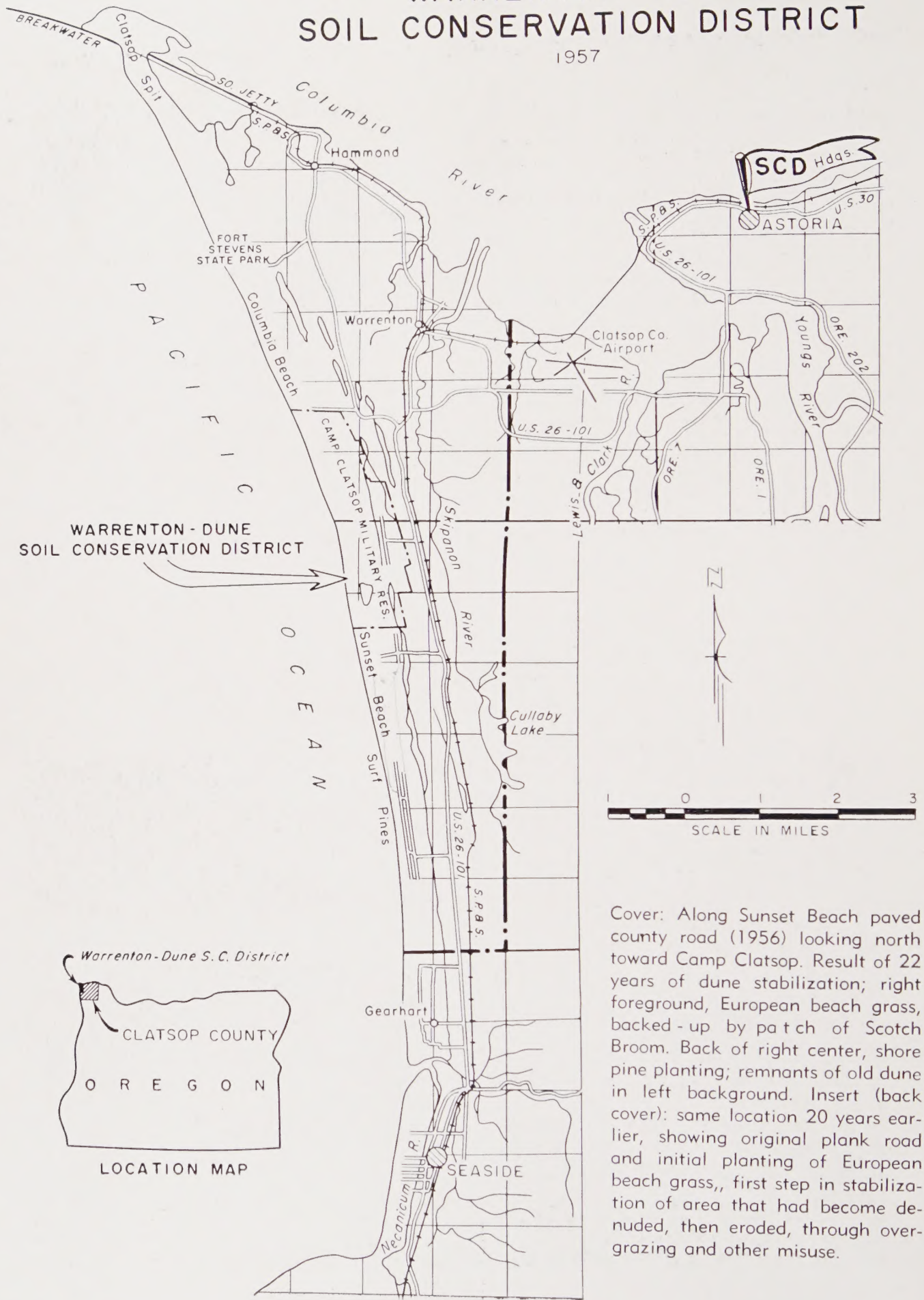
in cooperation with

CLATSOP COUNTY COURT... STATE of OREGON
PRIVATE LAND OWNERS and OTHERS, and the
U. S. D. A. SOIL CONSERVATION SERVICE

JUNE 1, 1957

WARRENTON - DUNE SOIL CONSERVATION DISTRICT

1957



Cover: Along Sunset Beach paved county road (1956) looking north toward Camp Clatsop. Result of 22 years of dune stabilization; right foreground, European beach grass, backed - up by patch of Scotch Broom. Back of right center, shore pine planting; remnants of old dune in left background. Insert (back cover): same location 20 years earlier, showing original plank road and initial planting of European beach grass,, first step in stabilization of area that had become denuded, then eroded, through overgrazing and other misuse.

SUCCESSFUL PATTERN IS DEVELOPED FOR AROUND WORLD USE

On 3,000 acres of dunes, piled up and then ripped apart and denuded by powerful sand-filled Pacific winds that sweep over Oregon's north-western coast, Warrenton Dune Soil Conservation District has rounded out 22 years work, at the mouth of the Columbia river in establishing the pattern of a successful stabilization program that got its start as a CCC project.

Expert observers say there is nothing quite like this accomplishment elsewhere in the U. S., or in the world. In two instances in this country, one on each coast, successes have been achieved in varying degrees, but not on such an extensive and effective scale.

This pattern is built around one keystone practice—putting sand under a complete cover of grass, then keeping it so firmly tied down there that denuding and erosion can never again get started on another rampage and cause tremendous damage. It's so effective in establishing and maintaining erosion control, and putting wind-swept dune areas in shape for income-producing use, that it is being applied around the world in attempts to cure sore

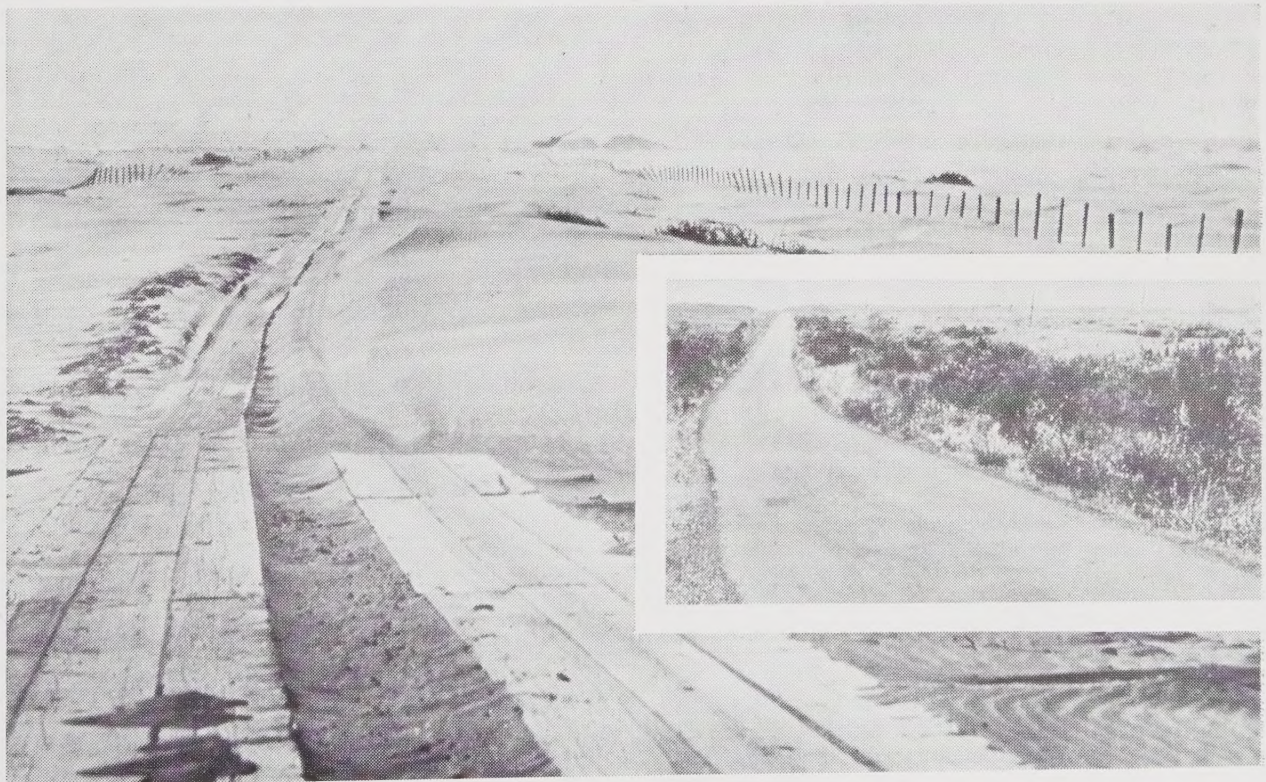
spots similar to those Warrenton had about a quarter century ago.

Three planting materials—an improved European beach grass, a shrub named Scotch broom, and native shore pine trees—have been principal performers on the dune stabilization scene. More than 200 million single plantings of these materials have been made, all by hand; many millions more will be planted before stabilization is completed on 1,500 additional acres where work is under way, or has not yet been started.

Picket fences, native grasses and legumes, and land-use regulations established by dune property owners under authority of Oregon state law, have had supporting roles. By zoning, tillage and grazing have been prohibited, and "we're going to keep it that way," Warrenton dune folks agree, because they recognize that without zoning, dune stabilization would not have been achieved.

From a start at scratch on bare ground, 100 feet wide and 100 feet from high tide, the dune stabilization pattern includes creation of a 34-foot

Below: This is how old plank road, leading to site of present Ft. Stevens State Park beach, appeared in 1935; historic 1906 Peter Iredale wreck in center background. Sand piled up and closed road, making continuous and costly maintenance necessary. Fencing, left and right, built by farmers to safeguard livestock. Insert: Identical scene in 1956, 21 years after stabilization of dunes was started. Modern hard-surfaced road annually leads thousands of visitors to park and beach.



high fore-dune that stretches 12 miles along the coast, close to the tide's high line; so near that parts of it were washed out by several winter storms before it could get set and break up the attacks of winds and wash. Back of this front line to an average depth of 1½ miles, like stabilization has been done in repairing breaks in old dunes and building an unbroken cover of new vegetation everywhere—on the dunes, and in valleys or troughs between them. Throughout the 3,000 acre area, erosion has been conquered. Sand has been stopped from moving inland.

From its 100 foot wide starting base, the new fore-dune has spread to a 350-foot wide foundation. Most of this expansion is on the windward side. Up that face, toward the Pacific, and on over the top, it presents a thick close-knit cover of grass which is strong enough to turn back the heaviest onslaughts of wind and sand and give the soil complete protection. On the lee side, grass, trees and shrubs team-up in like resistance.

Beach grass—what Holland has long used to protect its famous dikes—has always played the leading role in rehabilitation of the dune area. At Warrenton an improved strain was developed at a dune nursery, established by Soil Conservation Service to produce planting stock. Started as a 4-acre experimental area, producing a few hundred thousand plants per year, it grew into a 40-acre operation, producing 20 million plants annually, before it was abandoned in 1948. The initial planting stock for experimental use at this nursery was obtained from Coos Bay, Oregon, where an exploratory stabilization project had been launched on a small area.

Beach grass is the star performer because it likes sand; the more it gets, the better it grows. A complete covering of fresh sand is just like a good meal, because the beach grass quickly pushes its way right up through the compact blanket and becomes stronger and better through this exercise. When it is piled up on beach grass, fresh sand acts just like a stimulant. Without this boost from sand, beach grass plantings die, unless fertilized.

The chief value of beach grass is in its quick development as an effective cover crop. It lacks feed value because livestock simply will not eat it. The planting season starts in October and continues until May or June, when weather becomes warm. The growing season starts with planting and continues through August or September. Then, after a short season rest, new growth begins and soon pokes its head through the mass of the previous season's crop. Growth always is strongest and fastest atop dunes and on the windward side. Plantings are made at 18-inch spacings, in clumps of 3 pieces of 18-inch stock of which at least 8 inches remain above ground. Growth is mature at about 3 feet.

Scotch broom and shore pines serve best when planted in the Soil Conservation Service land-use capability pattern—trees on steeper slopes where

they will thrive and where grass would have terrific difficulties in developing strength, and trees and shrubs on rough and hard-to-handle areas where grass doesn't do well, but good wildlife habitat can be produced. Scotch broom grows to a height of 6 or 7 feet before it is fully developed. Shore pine matures at about 50 feet.

In early plantings in the dune area, grass, shrubs and trees were inter-mixed about everywhere. In recent years this practice has been abandoned and land-use capabilities have become the guide. In tree and shrub plantings, survival has been very high. Tree failures were among species not suitable to the climate.

Trees do the best stabilization job when they are planted in blocks, a system that opens the way for fire lanes. Block plantings have been made in about half of the 3,000 acre area. Since 1954 plantings of shrubs and trees have been temporarily discontinued because flow of planting stock stopped when SCS nurseries were closed. The only current source for these planting stocks is through purchases by land owners from commercial growers. At the start, under the original CCC program, planting stock and planting labor were received from government without cost to the property owners. From government sources, when the SCD took over, property owners continued to receive planting materials without cost, but each individual paid for the planting labor used at his property. It is believed that stocks for work yet to be done can be obtained from SCS plant material centers which have been put in operation at former nursery sites.

Originally, picket fences, usually set in two parallel rows 30 feet apart, with pickets one foot below and 4 feet above ground, were used to help create the base for the new fore-dune and to mend breaks in old dunes. Sometimes, when building of the base had been started, fencing was lifted part way out of its original position so height of the base could be increased. The chief function of fencing was to catch and confine sand and create a solid, smooth surface where beach grass could get a good start. Likewise it helped prevent damage by incoming tides. Now, fencing is used only where there are special problems because of lay of land. Elsewhere, vegetation alone will meet all needs.

Before the practice was found to be unnecessary except in unusual situations, considerable use was made of picket fences. Twenty three miles were built with material hand-carried to the beach because roadways for vehicles didn't exist. Likewise, other planting materials and tools were moved to areas of use.

As a finishing-off process, particularly in valleys between old dunes and on easy slopes, after stabilization has been accomplished, native grasses and legumes, when drilled into beach grass and fertilized have become highly effective in giving protective cover a stronger upper-hand in sapping the destructive power of wind-blown sand. They make a ranker, denser and tougher growth than

beach grass and crowd it out of the picture. They are palatable, and livestock will eat them, but will not eat beach grass.

Warrenton Dune SCD is the first in the state to invoke use of the land use regulation provision in Oregon's soil conservation district law. Through a 1948 referendum, as provided by this law, at least three-fourths of the votes cast, representing at least two-thirds of the land ownership in the area, were favorable in authorizing Warrenton Dune SCD to protect 5,864 acres by zoning. Two zones were created. In one, grazing, tillage and construction of buildings are prohibited. In the other, grazing and tillage are prohibited, but construction of homes and creation of recreational facilities, with limitations, are permitted. The area is about evenly divided between these zones.

Launching of the original 3,000 acre stabilization project came about as a result of serious threats that galloping sand presented to welfare of coastal communities along a 15 mile front, and to an average depth of 1½ miles, which constantly was becoming deeper. Beaches and resorts were being damaged. Columbia River ocean shipping lanes, highways, roads and other avenues of travel were being filled with sand, and continuation of state and federal military establishments was menaced. Homes and other buildings were damaged and destroyed and further use of summer homes and cottages was imperiled. Sand was filling-in lakes and wooded areas. Crops were wiped out, livestock was threatened, and there was rapid climbing in the amount of tax delinquent property. At least 3,000 acres were not producing any taxes.

Before early 20s, in valleys between dunes and on easy slopes, grass, top-flight in hay and forage qualities, "grew as high as a horse's belly". Farm livestock licked their lips in these lush pastures, and were the basis of a profitable industry. All of the trouble that followed started with overgrazing and other misuses of land, and the construction of a jetty on the south side of the Columbia river. These acts brought on wind and water erosion that denuded the soil or built out additional land that previously had not been covered by vegetation.

While a small dune stabilization activity had been conducted on an experimental basis at Coos Bay by army engineers and the navy in 1926-28, and in 1934 by Forest Service at Siuslaw National Forest, south of Reedsport, another Oregon coastal town, the program launched at Warrenton was the first to get started on a large scale along the west coast to elsewhere in this country.

Success achieved at Warrenton Dunes has attracted attention where like problems exist in this nation. Many foreign countries have sent official representatives to study the system, and shipments of planting stock for experimental work have been sent to those areas. Overseas visitors have come from Iceland, England, Mediterranean, Middle East and North and South Africa countries, India, New Zealand and the Philippines, as well as such good neighbors as Canada and South American nations.

Development of the project started with obtaining establishment of a Civilian Conservation Corps (CCC) camp at Warrenton in 1935 for the one specific purpose. The labor force consisted of 150 youth working under direction of foremen and Soil Conservation Service technicians. It was a start from scratch venture because no successful means of attack had ever been developed. While there were some ideas as to what materials might be required, selection of these materials was still in the questionable stage. About the only 'sure thing' was existence of a dangerous problem that had to be handled as quickly as possible.

CCC carried through experimental work and got the plan of attack pretty well established before it went out of existence in 1941. Warrenton Dune Soil Conservation District was set up to take over when CCC dropped out and, with the continuing technical assistance of Soil Conservation Service it has kept the work moving toward its successful conclusion.

Looking back over the 22 years work with the dune problem, community leaders, who have worked with the project from its inception, cite these particular benefits, among many that have accrued:

Broadening of the tax base by opening way for safe construction of homes and business places and establishment of recreational facilities for use of year-around, summer and vacation people, all of which has created constantly increasing community income;

Protection of Columbia river shipping lanes, state and county roads and highways and other routes of travel, bringing deep cuts in heavy annual maintenance costs;

Removal of menaces to Fort Stevens and the 1,700 acre Camp Clatsop, military establishments of the U. S. and state governments;

Establishment and expansion of the 750-acre Fort Stevens State Park which attracted 170,000 visitors and 9,300 campers in 1956, as a recreation center offering salt and fresh water bathing, water sports, fishing, boating, picnic areas and over-night camps;

Opening of way for recovery of good agricultural land and restoration of forage and other crops through application of soil and water conservation practices, such as drainage that will permit cropping of water-logged acres, long out of production.

Development of 250 acre game preserve, stocked with game birds by Oregon State Game Commission, with restricted hunting; over-all creation of wild life habitat, and launching of new dune area housing developments, one of which includes 17 residences having an average valuation of \$25,000.

Last year, when 8,000 more acres were added to the SCD's area, it put another 1,000 acres into the dune program. The current stabilization schedule calls for completion of work on the remaining



Above: In 1937, remnants of original fore-dune extended parallel to ocean front (from lower left). "Potholes" had been gouged out by wind and sand, and gaps had been cut, allowing sand to invade and cover lush meadowland. It piled into Sunset Lake, damaged resorts and Columbia and Sunset beaches and threatened National Guard camp (white rectangle, upper right). Between original dune and ocean, new fore-dune is being started for stabilization of area. Part built without using picket fences, only beach grass. Stream in right background is Columbia river; ocean at left. It was across this narrow neck of land that winds were piling sand into the Columbia, threatening to cut off navigation.

1,500 acres during the next 5 years. On most of the 500 acres left in the original project, stabilization is well under way.

Scope of the sand problem faced 22 years ago is indicated by such developments as finding an original survey corner stone buried as deep as 37 feet under wind-blown sand. Benefits are indicated by restoration of vegetation in the valleys and on easy slopes, where the grass is again almost as "high as a horse's belly", and gives indications of going even higher.

Restoration of that type of cover has come

about because Old Mother Nature has lent a helping hand by providing native grasses and legumes which, when drilled into the beach grass, crowd it out of the cover. These children of Nature have served as reserve troops which she rushed into the battle when the shock troops — European beach grass, Scotch broom and shore pine — had done their jobs. Mother Nature sure can raise a heck of a lot of trouble when here children are abused, as in the early 20s. She can help wonderfully when friends come to her aid, like the CCC folks and the Warrenton Dune SCD people, and the SCS technicians and other cooperators, have done during the last 22 years.



Above: Here is how new fore-dune, protected by picket fence, looked in 1937, a year after it had been started. It's ready for planting of European beach grass. Some plantings already made in back areas. In background, to right of men, sand hummocks have developed naturally because sand, carried by wind, clung to beach grass.

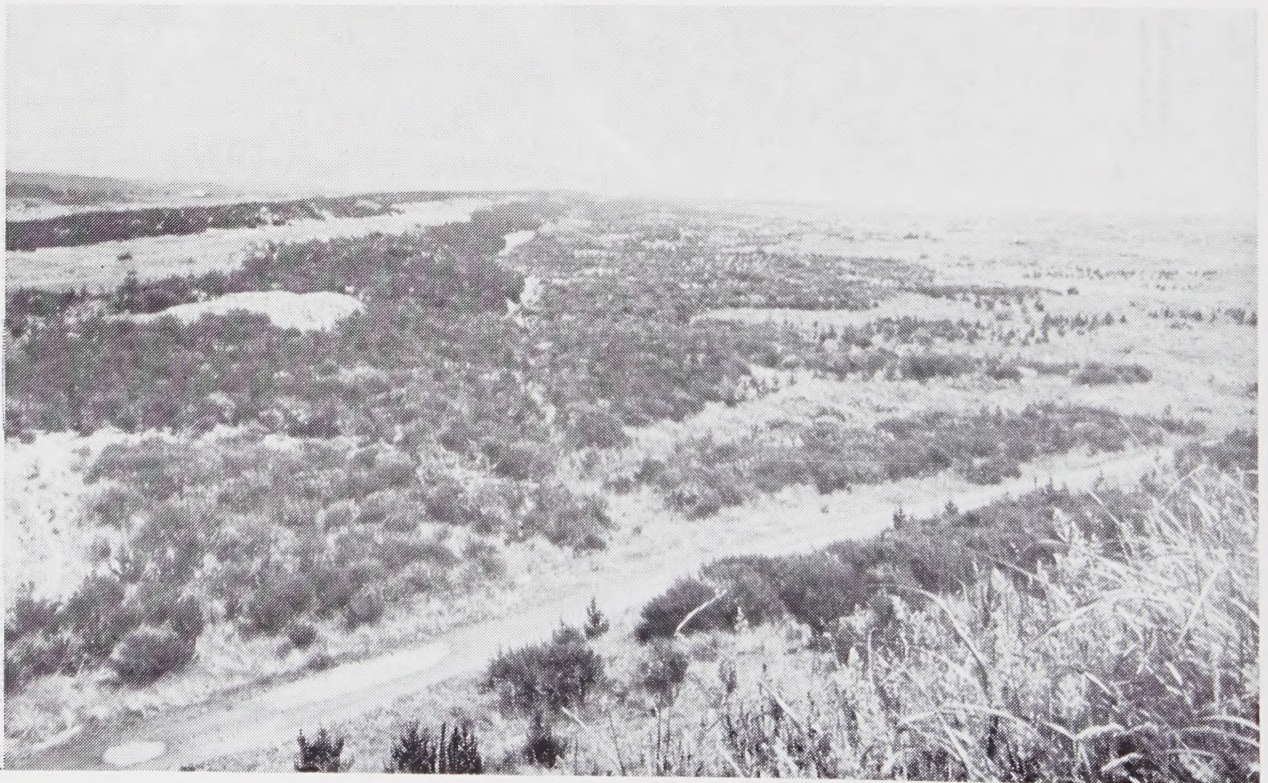
Below: Twenty years after new fore-dune was started, this is how it looked (1956). It is the freshly started fore-dune pictured on preceding page. On lee side, natural native grasses and legumes have been brought in by Mother Nature to help establish strong cover. Native legumes work like nitrogen fertilizer in speeding development of cover; supply good feed for wildlife.





Above: In Delura Beach road area, remnants of old plank road leading to beach have been scattered by wind. Back of wreckage is Camp Clatsop property.

Below: This is how same area appeared in 1956. White spot, center left background, is main building at Camp Clatsop. In foreground is Delura Beach road. Shrubs are Scotch broom, interplanted with shore pine, now about 6 or 7 years old.





Above: In this roadless area, as it appeared in 1937, the army, during World War II, built a gravel road leading to control station or lookouts between Ft. Stevens and Camp Clatsop. In starting stabilization of area, CCC boys packed planting stock in on foot. Sand is piled up on former level areas. Remnants of original dune in central background; trees in background mark site of present Ft. Stevens State Park. In this level area there once was luxuriant grass, with no wind erosion.

Below: Here is identical site, with new gravel road built by military services. Beach grass and shore pine plantings appear in foreground.





Above: On county property, north of Columbia Beach road, here is a 6-weeks old European beach grass planting. Sand piling up around base made each clump an individual barrier. Insert: After CCC boys left, men and women took over planting, all done by hand.

Below: Here is what had come out (1956) of this identical planting. When beach grass had developed, native and imported grasses and legumes were drilled into new cover and fertilized. In continued development of excellent cover like this, original beach grass disappears. In 1956, cover on valley floor looked like original growth before overgrazing, misuse and wind-blown sand wiped it off face of earth.





Above: This is how an area west of present Ft. Stevens State Park appeared in 1937. Between barren sand area in foreground, and native woods, there is a grass planting. Coffenbury lake lies back of trees. Sand blasts were taking out some trees and covering others, creating gaps through which sand swept to threaten usefulness of lake. It was area of desolation.

Below: By 1956 stabilization had produced a scene like this in identical area. Lower picture on preceding page illustrates same treatment that this area received. European beach grass, into which native grasses and legumes have been drilled, is in early stage of development. There is about 2 or 3 years difference in age of this development and that in lower picture in preceding page.





Above: Here is one way that erosion got started. Unrestricted livestock, wandering over dunes, cut sod and made paths which gave winds, sand and water chance to blast and wash the cover away. Zoning stopped this trouble making. Insert: This is kind of damage that cow paths and other breaks in cover led to about 1920.

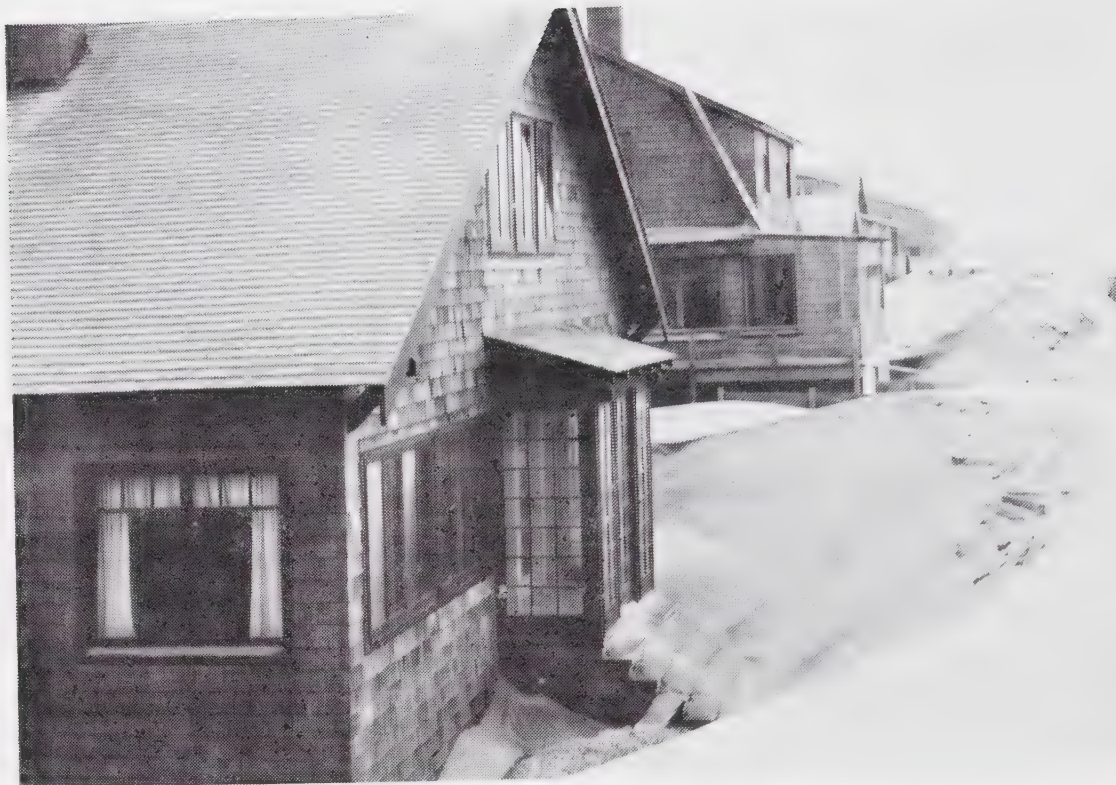
Below: When things such as this happen in the newly stabilized area, the door to destruction of cover is again wide open, and years of stabilization work can be wiped out. This damaged spot is near Ft. Stevens Park. To rebuild break, stabilization workers must start back at scratch.





Above: This 1938 view is south of Sunset Beach Road, with Sunset Lake in background. Cow path, like on preceding page, started erosion that led to destruction of ground cover. Wind, breaking down original dune, allowed sand to pile through and damage or destroy homes, woods and pasture. Fence indicates type of barrier used to stop cutting wind and protect property back of it while plantings of beach grass and trees were developing. Below: Here is the identical area in 1956 after shore pine had taken over and become effective barrier against wind blasts.





Above: Winds and sand caused troublesome problems for home owners and renters in areas in southern part of district, where there were concentrations of such buildings. Sand piled up to height of second floor of residences, blocking leaving or coming. Heavy expense was caused in removing sand, sometimes several times a year. Picture in Gearhart area in 1935.

Below: With stabilization of dunes, modern new houses are built. Here is part of Surf Pine development on top of dune overlooking beach. It was started in 1947 and includes 17 residences with average value of \$25,000.





Above: This was taken in Peter Iredale road area, west of Coffenbury lake, in 1935. Shows how sand was working way through wooded area blasting trees and threatening use of lake. In this area, Ft. Stevens State Park has been developed.

Below: Barren sand area, in 1937, just south of Hammond Beach road. Double row of picket fence, extending toward left foreground from road (across top of picture) was built in 1935-36. Oblique fences, built at same time, protected "Alders" picnic center (at right) where portion of grove already had been destroyed. This mechanical means for establishing control was one of the trials used in testing materials and methods, and was abandoned in favor of vegetation with fertilization, which produced desired results more effectively and economically.





Above: CCC boys fertilizing native grass and legume plantings, directly south of Peter Ire-
dale road at north end of Coffenbury lake, site of present Fort Stevens State Park.

Below: Same site as in picture at top of this page; showing how people from all over the
country flocked to Fort Stevens State Park in cars, busses and trailers in 1956 to enjoy wide
variety of vacation and recreational activities.





Above: Extreme northwest corner of SCD, showing Columbia river in background, Pacific ocean on left, with Coffenbury lake, headwaters of east Neacoxie drainage project. Continued recreation area to be carried on by state parks, more picnic and overnight camp sites will be developed around Coffenbury and Crabapple lakes seen in background where pictures on preceding page were taken.

WAY CLEARED FOR NEW SOIL AND WATER CONSERVATION WORK

The situation at hand, after 22 years of work in sand dune stabilization, points up two specially important lines for future activity: (1) completion of the whole establishment job, in the original district and in the recent 8,000 acre addition, within the next 5 years, and (2) further development and more alert application of the maintenance program.

We would have been farther advanced in completion of the project if availability of planting stock had not been curtailed and in some instances entirely shut-off for long periods. Restoration of Soil Conservation Service plant material centers, we expect, will be helpful in stabilizing flow of planting supplies to our dune work program.

Maintenance work has been developed as the operation has progressed. Generally it has been effective, but in a few instances there have been difficulties, and threatening breaks in the dune cover have occurred. It is important that these

breaks be detected and remedied before great inroads have been made in protective plantings, and that action be taken to prevent a recurrence, whenever it is possible. This calls for more frequent and more careful area-wide checking. A system for handling this problem has been carefully developed and will meet the needs, if we keep our eye on the ball.

There also is need for another item in maintenance — the protection that is afforded by creation of fire-breaks in wooded areas. Nearly 20 miles of these fire-breaks have been established, and a lot more are needed. Most of the earlier plantings are entirely without fire-breaks. This creates a tremendous hazard. Fire-breaks are included in the more recent plantings. Application of these protective measures was delayed at the start because of a lack of information on time required for development of woodland, and data on survival of plantings of varied species.

LOOKING INTO THE FUTURE . . . DUNE JOBS THAT ARE AHEAD

The preceding report of activities and accomplishments of Warrenton Dune Soil Conservation District, since it was established in mid-1941, doesn't tell all that has been done under its program. It covers only major activity. Progress has been made in other lines of attack on long-standing soil and water problems. This improvement work necessarily has been restricted because most of it could not be started until farmers and other land owners had definite assurance that stabilization of the sand dune area is so far advanced and so solidly set up that completion at a reasonably early date is a sure thing. To attempt most of these additional improvements at any earlier date would not have been sound business. Now, we are ready to go ahead.

Throughout the SCD there is considerable need for tile and open ditches to wipe out excess water problems at individual farms and on groups of farms in a particular community. There also is urgent need for improvement of grass-land operations by getting many more acres under a good cover of grass that will provide excellent forage for livestock and strengthen the important local dairy industry.

Establishment of new and improved sprinkler irrigation systems, and application of such good farming practices as crop rotations, rotationed and deferred grazing, land clearing, and fertilization and strip cropping call for attention. Additionally, there is need for better land-use, such as planting trees and shrubs where grass or other crops cannot be produced, but wooded tracts and wildlife habitat can be developed.

Some work has been developed along most of these lines. Now that the sand dune stabilization is certain to be successfully completed, farmers and other land owners can move ahead with additional improvements, under the SCD program, as rapidly as they are able and willing to proceed. In this

work they have available, upon their request, the technical and cost-sharing programs of the U. S. Department of Agriculture.

The recent addition of 8,000 acres raises the area of the SCD to 13,468 acres. This expansion opens opportunities to get long needed jobs started. For example, it makes it possible to open an outlet to the Columbia river and drain an area that lies within the original district as well as the addition. Some drainage work has been started and more is being planned for early action. One of these jobs — a group project — involves improvement of 8 to 10,000 acres in about 40 farms.

The district supervisors and cooperators face the future with full confidence in their ability to develop a more stable and productive agriculture that will be highly important in increasing the economic strength of the whole area and all of its people. Throughout the history of this soil conservation district, the organization has had wholehearted assistance of many local, county, state, federal and private organizations and individuals. It hopes to receive, and cordially invites, a continuance of this team work. If we continue to work together, we can get the whole job done quicker and more effectively.

Charles M. Johnson, Chairman

Robert Reed

Peter Plyter

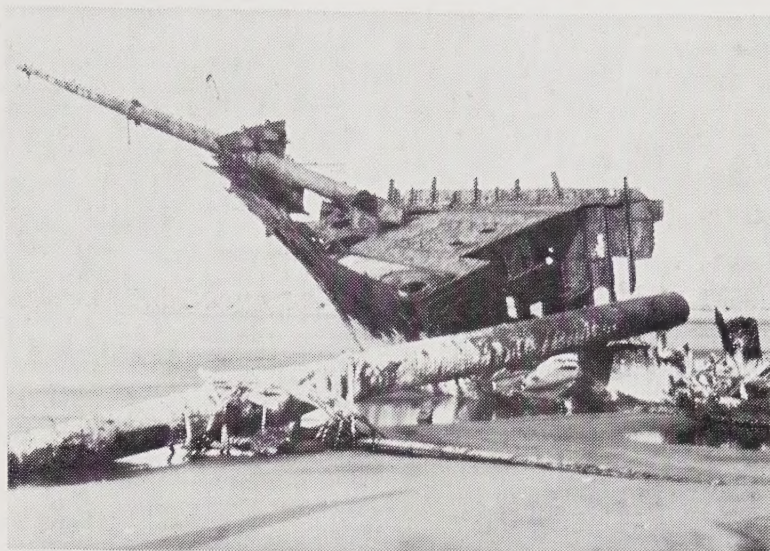
Dr. Noel W. Rawls.

Donald Tagg,

District Supervisors.

Below: Warrenton Dune SCD 1956-57 governing body: Front row, l to r, Supervisor Donald Tagg, Chairman Charles M. Johnson, and Supervisors Peter Plyter and Robert Reed; back row, l to r, Secretary Jack Wood, Extension County agent; Supervisor Noel B. Rawls, and Bryson R. Lausch, Soil Conservation Service technician.





WRECK OF PETER IREDALE, FOUR-MASTED SAILING SHIP, GROUND
ED IN OCTOBER, 1906. CLATSOP BEACH LANDMARK, LOCATED OFF
FORT STEVENS STATE PARK

